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Understanding and Knowledge of Credit Cost and Duration: Effects on Credit Judgements and Decisions

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Abstract

Financial capability requires understanding measures of consumer credit cost and using them appropriately in credit judgements and decisions. In three studies, UK adults' understanding and use of credit cost and duration information were investigated from a bounded rationality perspective. Study 1, part of a representative survey of UK adults (N = 1000), found that when presented with annual percentage rate (APR) participants significantly overestimated the total cost (TC) of a 12-month loan. In Study 2, loan duration and APR were varied in an independent groups experiment (N = 242). Bank customers' TC estimates were sensitive to both loan duration and APR but TC was again substantially overestimated. Study 3 was an independent groups experiment investigating the effect of APR and TC information on credit decisions (N = 241). APR often influenced decisions between loans varying in duration and monthly repayment, but this effect was moderated by TC information. It was concluded that: (1) people generally misunderstand the relation between APR and TC; and (2) although APR information can have a large effect on credit decisions, its effect is either attenuated or amplified by TC information. The findings are interpreted in terms of a 'take the best APR' heuristic and a dual mental account model of instalment credit. Recommendations for improving credit information provision and financial education are offered.

Keywords: Consumer credit, decision making, Annual Percentage Rate, Total Cost, Mental accounting, Decision heuristics

JEL classification: D18

Understanding and Knowledge of Credit Cost and Duration: Effects on Credit Judgements and Decisions

1. Introduction

Consumer credit steadily increased after the 2nd World War and accelerated from the 1990s. For example, in the US, credit card debt increased 214% from 1990 to 2004 (Hodges, 2009). In Europe consumer credit also increased, with the UK leading the expansion with 30% of the total of the fifteen full members of the European Union (Department of Trade and Industry, 2005). The level of outstanding individual unsecured credit in the UK rose from £125 billion in 1991 to £225 billion in 2007 (Department for Business, Innovation and Skills, 2009). Credit is seen as making a vital contribution to these economies by driving economic activity and giving consumers access to the market place (Department of Trade and Industry, 2004). However, in the last few years there has also been considerable concern about the levels and consequences of personal debt. In order to better understand and support credit consumers' financial capability (Atkinson et al., 2007), thereby helping them to avoid default and debt, it is necessary to investigate the quality and nature of credit judgements and decisions. The approach taken here utilises and develops important concepts of bounded rationality, including mental accounting and decision heuristics (Ranyard, Hinkley, Williamson & McHugh, 2006).

Kamleitner and Kirchler (2007) suggest that there are three important stages of consumer credit use: before credit-take up, credit decisions themselves and subsequent processes and behaviour. We focus on decisions at the time of credit take-up, such as which lender and specific product to choose, how much to repay per month and for how long. These are crucial financial decisions central to the economic wellbeing of households and individuals in contemporary market economies. Clearly, cost and loan duration are major

aspects borrowers consider in making such decisions. With respect to cost, a large-scale field experiment carried out in South Africa randomly varied across groups the monthly interest rate of real credit offers in the range 3.5-13.0 percent (Bertrand et al., 2005). The rate of acceptance of credit offers was significantly price sensitive, with on average, a 1.0 percent decrease in monthly interest rate leading to a 3.5 percent increase in acceptance. However, in that study it was not possible to say whether consumers were influenced by the relative cost of credit (interest rates) or the absolute cost (e.g. financial charge, FC), since these were confounded.

The first issue we consider is borrowers' understanding of annual percentage rate (APR) and its relation to the total cost of credit, TC. This important element of adults' financial capability (Lewis & Scott, 2000; Taylor, Jenkins & Slacker, 2009) is investigated in a study of the effect of APR information on estimates of the TC of a one-year loan, followed up with a replication and extension in which the duration and APR of credit options were systematically varied in an independent-groups experiment. Neither Kamleitner and Kirchler's (2007) review, nor our search of subsequent literature, has identified any previous systematic investigation of the effect of APR information on estimates of TC. The second issue is we consider concerns the effects that APR and TC information may have on credit decisions. From a bounded rationality framework we argue that: (1) people construct simplified representations of instalment credit that can be described in terms of mental accounts (Tversky & Kahneman, 1981; Shefrin & Thaler, 1988; Thaler, 1985, 1999), in particular the dual mental account model described by Ranyard & Craig (1993, 1995); and (2) people have an 'adaptive toolbox' of decision heuristics and strategies to select from when making credit decisions (Bettman, Luce & Payne, 1998; Payne, Bettman & Johnson, 1993; Ranyard et al., 2006; Svenson, 1996). In the present research, the effects of APR and

1 TC information on credit decisions are investigated in a replication and extension of Ranyard
2 et al.'s (2006) Study 2.
3

4 The structure of the rest of the paper is as follows. In the next subsection the
5 relationships among different measures of consumer credit cost and loan duration are
6 examined in detail. This is important for two reasons: (1) to clarify the complexity of the
7 APR measure of relative credit cost, and its complex relationship with the simple measures of
8 absolute cost (financial charge, FC and total cost, TC); and (2) to consider the implications of
9 this for credit judgements and decisions from a bounded rationality perspective. Following
10 this we introduce our specific hypotheses. Then, in the next two main sections we present the
11 three studies introduced earlier. In the final section the findings are discussed from a bounded
12 rationality perspective, and recommendations to support consumers' financial capability by
13 improving credit information provision and financial education are offered.
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29 *1.1. Financial capability, credit cost measures and bounded rationality*

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31 From the rational economic perspective, a financially capable person should evaluate
32 the cost of a loan in terms of the average amount charged per unit of time as a percentage of
33 the amount borrowed, taking into account that the amount borrowed (1) increases when
34 interest is added and (2) reduces as repayments are made. This is the basis of the APR
35 measure of credit cost enshrined in 'truth in lending' consumer protection legislation in many
36 countries (e.g. The UK Consumer Protection Act, 1975). The APR is said to accurately
37 describe the price of borrowing money when the only charges involved are interest charges.
38 However, the legal definition of APR usually includes additional charges, such as obligatory
39 mortgage administration charges (see Lee & Hogarth, 1999; McClatchey & de la Torre,
40 2006). The issue of additional charges will not be considered here, since many consumer
41 credit arrangements do not involve them.
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1 In addition to APR, consumer legislation nowadays requires that where possible
2 borrowers are informed of a second measure of credit cost, the financial charge (FC): that is,
3
4 the total of all charges incurred over the lifetime of the loan, including both interest and other
5
6 necessary charges (note that the TC of a loan is the FC plus the amount borrowed). As
7
8 explained below, from a bounded rationality perspective, a financially capable person should
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10 also consider these absolute measures of cost, together with the duration of a loan and the
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12 instalment repayment amount (usually monthly repayment, MR).
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16 There are two main differences between the APR and FC measures of cost: (1) APR
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18 is an abstract statistic that is quite complex (a percentage rate over time) whereas FC is a
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20 concrete amount of money; and (2) APR is a relative measure (cost per year), whereas FC is
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22 an absolute measure (charge for the whole transaction). Yard (2004) considered whether
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24 people's intuitive perceptions of the cost of credit were related more to APR or to FC. He
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26 asked first and third year business administration students to rank three credit alternatives,
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28 described only by their monthly repayment and number of instalments, from high, to
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30 medium, to low cost. He found that most rank orders corresponded to the FC of the credit
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32 offers rather than the APR. This persisted in a second study where some participants were
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34 given additional information of a simple, relative cost measure, the annual financial charge
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36 for credit (FCA). Yard's findings suggest that people's intuitive evaluations of credit cost are
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38 based more on absolute, money cost, than relative, percentage cost. This is consistent with
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40 Ranyard and Craig's (1995) dual account model of credit cost, which proposes that one
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42 mental representation, or account, that people use is the total account; that is, the sum of all
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44 repayment instalments (the absolute, total cost, TC)¹.
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57 ¹ Prelec and Loewenstein's (1998) double entry mental accounting model argues that gains (the receipt of the
58 loan) and losses (the repayments) are mentally represented in separate accounts, and these interact in different
59 ways, depending on how such outcomes are distributed over time.
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1 The dual mental account model (Ranyard & Craig, 1995) proposes that a second
2 mental representation or account people use for credit alternatives is the recurrent budget
3 period account; that is, the set of income and expenditure outcomes that recur periodically
4 within a budget period, often a month. Within this representation the important measure of
5 credit cost is MR (and also a relative measure of cost, such as the financial charge per month,
6 FCM). Also, the number of budget periods (n) over which the repayment has to be made is
7 important in the recurrent budget period account.
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10 From the perspective of the dual account model APR is important because of its
11 implications for the total and the recurrent budget period accounts: borrowers often assume
12 that lower APR means both lower TC and lower MR (see Ranyard et al., 2006). In fact, the
13 precise relation between APR, TC and MR is rather complex, and two errors in understanding
14 this relationship are likely to occur. These are readily understood if we consider Yard's
15 (2004) suggested calculation for an approximate APR, denoted AAPR. First he defined a
16 simple relative measure of credit cost, the annual financial charge, $FCA = FC/N$, where N is
17 the loan duration in years. He then assumed, for a given amount borrowed (L), that a
18 reasonable approximation to the average amount borrowed over the duration of the loan is
19 $L/2$ (although it is often an under-estimate). Approximate APR is calculated as the annual
20 financial charge (FCA) as a percentage of the average amount borrowed ($L/2$):
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$$23 \text{ AAPR} = 100 \times FCA / (L/2).$$

24 Yard argued that this is a reasonable approximation in the range APR 5% to 35%, and it
25 should be relatively easy for borrowers to understand and calculate. We argue later that
26 learning to calculate AAPR from FC, and vice versa, would improve people's financial
27 capability. First, though, it can be seen Yard's (2004) formula for AAPR makes transparent
28 possible misunderstandings of the relation between APR and FC or TC: in particular, it
29 shows that APR is based on the average amount borrowed, about $L/2$. People may fail to
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recognise this, and believe instead that it is based on the initial amount borrowed, L. This brings us to our first research question.

1.2. *The effect of APR and duration information on estimating the total cost (TC) of credit*

Since the introduction in the US of the ‘truth in lending’ regulatory framework over forty years ago, there have been many surveys of the consumer’s knowledge and understanding of APR. The overall conclusion has been that although many adults do understand the basic idea and can use APR information appropriately in some circumstances, their understanding is limited. For example, the UK’s Office of Fair Trading commissioned a study of adult understanding and use of credit cards which involved a large-scale survey and several focus groups (Office of Fair Trading, 2004). The survey found that many credit card holders knew that APR represents the interest rate and nearly half of them spontaneously mentioned this first when asked for factors that were important in their choice of credit card. The importance of interest rates was supported by focus group comments such as ‘Well, it’s just the lower it is the better, isn’t it?’ (p. 23). In addition, survey respondents were presented with detailed written information about three currently available credit card offers and asked to judge which of them had the lowest overall cost. Subsequently, over half said that APR was the most important piece of information used in their judgement (see also Office of Fair Trading, 1994).

Turning to the understanding of the relation between APR and FC, several surveys have investigated consumers’ knowledge of both measures of cost. For example, Kinsey and McAlister (1981) mailed 24,000 questionnaires (response rate 55%) to a random sample of households in Minnesota, US, where the maximum legal APR was 12% at the time of the survey (1977), and found that 32 percent knew this legal maximum. The question they asked concerning FC was: ‘In your opinion, what would be the *DOLLAR* amount of the *finance charge* on a \$100 purchase paid in 12 equal monthly payments on a retail store revolving

charge account in Minnesota?’ By far the most frequent response was ‘Don’t know’, with 43%. Of the other responses the modal category was \$12 (18%), whereas only 5% responded with ‘less than \$6’ and 11% with ‘\$6.00 – 6.99’. These last two were considered to be the correct responses for an APR of 12%, for which the FC would be between \$5.5 and \$6.5. Further analysis showed that correct FC response was significantly associated with knowledge of the maximum APR in the state. Nevertheless, among knowledgeable respondents there was a clear bias towards the 12% response, which can be interpreted as a misunderstanding that the FC will be 12% of the initial loan. However, respondents were not explicitly presented with the APR and we do not have direct evidence of the effect of knowledge of APR on FC or TC estimates. Study 1 was designed to provide such evidence, examining the effect of specific APR information on estimates of TC for a one-year loan. This is followed up in a more extensive investigation (Study 2) in which both APR and loan duration were systematically varied.

1.3. The effect of APR and total cost information on credit decisions

Turning to our second main issue, Yard’s (2004) findings discussed earlier suggest that people’s evaluation of credit cost is based more on absolute, money cost (FC, TC) rather than relative cost (APR, MFC). Also, Ranyard et al. (2006) reported in their process tracing study that TC was an aspect explicitly considered by some participants when making credit choices. Although other participants focussed on monthly cost, they did not segregate the relative cost of credit, e.g. the monthly financial charge, MFC, from the overall monthly repayment, MR. These findings were interpreted in terms of the dual mental account model of instalment credit discussed earlier (Ranyard & Craig, 1995). However, a third group of participants focused on APR when making credit choices, which could indicate representations of instalment credit similar to the rational economic model. On the other hand, adults in contemporary credit-based economies may simply learn that low APR is a

1 useful cue to a good credit deal, and as Ranyard et al. suggested, adopt the ‘take the best
2 APR’ heuristic. As discussed earlier, the OFT (2004) study also found evidence that
3 consumers use APR information in this way. Furthermore, some of Ranyard et al.’s think
4 aloud protocols indicated that participants believed that lower APR implies lower TC and
5 lower MR. While this belief is valid for comparisons between credit alternatives with the
6 same number of equal instalments it is not valid when instalment patterns differ.
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14 The relative impact of these two key aspects of credit cost information (APR and TC)
15 was further investigated in a follow-up experiment (Ranyard et al., 2006, Study 2). It was
16 found that where APR information was provided, it did influence choice in the predicted
17 direction, in favour of alternatives with lower APR. However, when conflicting TC
18 information was given in addition, this moderated the influence of APR. The previous
19 experiment was relatively small in scale, however, and Study 3 is a more extensive
20 experiment designed to explore the interaction between APR and TC in more detail.
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31 2. Study 1 32

33 As explained earlier in Section 1.2., previous studies suggest that people often
34 misunderstand the relation between APR and FC (and therefore TC), making the erroneous
35 assumption that the FC of a loan is the amount borrowed \times APR/100, which would lead to
36 over-estimation of the TC of a 12-month loan when given specific APR information. The
37 main aim of Study 1 was to test this overestimation hypothesis.
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46 2.1. Method 47

48 Study 1 was part of a survey of the financial knowledge and understanding of UK
49 adults; 1023 respondents aged 16 and over were interviewed face-to-face by trained
50 interviewers in 2004. This was a quota sample of the UK based on gender, age, social grade,
51 working status and region weighted to reflect the national profile. The questions were
52 designed by one of the authors in collaboration with an internet bank and were used for
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commercial purposes. First, respondents' basic knowledge was probed with the question:
What does A.P.R. stand for? Six responses were available: a) Annual Property Revenue; b) Annual Perceived Revenues; c) Annual Percentage Rate; d) April Percentage Rate; e) None of the above; or f) Don't know. Next, two further questions probed their understanding of the relation between APR and TC. The first asked them to estimate TC without a specified APR as follows:

Many people borrow money to purchase cars or to make household improvements.

Say you were to borrow £5,000 from one of the major banks to be paid back over 12 months, approximately how much do you think you would pay altogether?

Approximately: £5000 £5100 £5400 £5700 £6000.

To investigate the effect of APR information, they were then asked the following:

I am going to give you some extra information this time (please keep your answer to the previous question the same). The amount of the loan remains at £5000 and the loan repayment period is still 12 months but you now know that the A.P.R. is 8%.

How much do you think you would pay back altogether?

Approximately: £5000 £5100 £5400 £5700 £6000.

The correct answer to the second question was approximately £5,200, but if respondents assume that APR represents the interest charged as a percentage of the initial amount borrowed, responses would migrate from their initial estimate to £5,400, or £5,000 plus 8% of the initial amount borrowed; that is, they would generally over-estimate, rather than under-estimate TC.

2.2. Results

The question ‘*What does A.P.R. stand for?*’ was answered correctly by 83% of the sample, incorrectly by 7.2% with 9.8% responding ‘don’t know’.² The percentage responses to the second and third questions are shown in Table 1. It can be seen that the most frequent estimates were £5,400 and £5,700 with about one fifth responding £6,000, and a similar proportion responding ‘don’t know’. When APR was given the percentage of the latter responses hardly changed, whereas the percentage responding with £5,400 increased substantially. The percentages of other estimates all decreased, particularly the higher ones. In terms of the hypothesis, Table 1 shows that many responses changed from their initial estimate to £5,400, or the initial amount borrowed plus 8%, suggesting that many respondents believed that the FC for a one-year loan would be the APR percentage of the initial amount borrowed. A Wilcoxon signed-rank test of the difference in median TC estimate on the two questions, excluding don’t know responses (n = 743), showed that the decrease in estimates after APR information was significant ($z = -6.3, p < .001$).

----- Table 1 here -----

3. Study 2

One problem with Study 1 was that on the second TC question respondents could not give the correct response of approximately £5,200; rather they could either under-estimate (£5,100) or over-estimate (£5,400). As we saw, there were few responses of £5,100 or less, and rather many over-estimates. However, it is necessary to check the estimates that respondents give when the correct response is available. The first aim of Study 2, then, was to replicate Study 1, thereby retesting the hypothesis that people overestimate the TC of a 12-month loan when given specific APR information, but with the response option of £5,100 changed to £5,200.

² Discriminant function analysis showed that social class and whether respondents had multiple bank accounts were the best predictors, with number of years of education also being significant; on the other hand, age, gender and income were not.

The second aim of Study 2 was to investigate estimates of TC for two-year as well as one-year loans and for different APRs. Obviously, people should be sensitive to APR information and give higher TC estimates for loans with higher APR, which is our second hypothesis. With respect to loan duration, the outcome is less clear and we pose the question: will people continue to overestimate TC for 2-year as well as 1-year loans when given specific APR information? On the one hand, if they make the assumption that APR indicates the FC for a one-year loan as a percentage of the initial loan, and multiply this by the number of years of the loan, then the TC of a 2-year loan would be overestimated. Alternatively, if TC estimates are based on APR information only, without taking into account loan duration, then overestimation of 2-year loans will be less than for 1-year loans.

3.1. Method

Design and questionnaires. Study 2 was a survey of customers of a high street bank with some questions varied across participants in a randomised-groups experimental design. All the questionnaires began with the second and third questions of Study 1 with the change of response options explained above. In the next two questions APR (10% and 15%) and loan duration (1-year and 2-year) were varied in a 2 x 2 factorial randomised-groups design to investigate further the effect of this information on respondents' estimates of TC. First a one year-loan for either £15,000 or £7,500 was presented with question and response format as follows:

Imagine you have taken a loan for £7,500 with an APR of 10% to be repaid over 1 year.

Approximately how much would you have to repay in total?

£7,600	£7,700	£7,800	£7,900	£8,000	£8,100
£8,200	£8,300	£8,400	£8,500	£8,600	£8,700

This was followed by a similar question for a 2-year loan with the same APR but a different amount, £15,000 if the 1-year loan was £7,500 and vice versa. Four versions of these pairs of

1 questions were prepared with all combinations of initial amounts either £7,500 or £15,000
2 and APR either 10% or 15%. This gives for each initial loan amount a 2 x 2 factorial design
3 with independent variables APR and loan duration. The specific response options were
4 changed to ensure that an approximation to the correct answer was always available, with its
5 position among the 12 response options varied to avoid position-effect response bias.
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7 Demographic information relating to age, gender and income were also requested after some
8 other questions which will be reported elsewhere.
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11 *Participants and Procedure.* The participants were recruited from a random sample of
12 2000 adults from a high street bank's database of personal account customers. They were
13 randomly assigned to one of four equal groups each of which received one of the four
14 questionnaires, posted with a covering letter and return postage paid envelope. The letter
15 explained the purpose of the study and that any information provided was for research
16 purposes only and would remain anonymous. The participants were asked to read the
17 introduction, and then to make their decisions by ticking a box. Participants returning the
18 questionnaire could choose to participate in a cash prize draw. If they wished to be included
19 in the draw, contact details were to be entered at the end of the questionnaire, this information
20 was detached from the questionnaire during the opening and sorting process.
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24 Of the 242 replies, (12.1% return) nearly all completed the section on personal
25 characteristics: 62% were male and 38% female; 85% were working. The majority of
26 participants were older, with only 17% being between 16 and 40 years, 28% between 40 and
27 50, and 55% above 50. For annual income, 33% of respondents indicated it was up to
28 £20,000, 30% between £20,000 and £35,000, and 37% above £35,000. The number of
29 participants returning questionnaires in each group was 47, 61, 66 and 68. Chi-square and
30 Kruskal-Wallis tests showed that there were no significant differences in the above
31 demographic characteristics across the four groups.
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3.2. Results

The distributions of estimates of TC with and without APR information (first two questions) are shown Table 2. It can be seen that the most frequent estimate without APR was £5,400 with over forty percent, followed by £5,700 with over one third of respondents. Compared to Study 1, rather few participants, less than five percent, responded *don't know* while almost ten percent responded with £5,200. When APR was given, the latter percentage, which was the correct answer, hardly changed. In contrast, the proportion responding with £5,400 increased substantially to around three-quarters. In terms of the first hypothesis, then, Table 2 shows that as in Study 1, many responses overestimated TC when APR information was given, changing to, or remaining at, an estimate of £5,400, i.e. £5,000 plus 8% of the initial amount borrowed. This is again consistent with the erroneous belief that the FC for a one-year loan would be the APR percentage of the initial amount borrowed. As in Study 1 a Wilcoxon signed-rank test of the difference in median TC estimate on the two questions, excluding don't know responses ($n = 237$), showed that the decrease in estimates after being given APR information was significant ($z = -5.96$, $p < .001$).

----- Table 2 here -----

Turning to questions 3 and 4, the means and standard deviations (SDs) of TC estimates for each credit alternative are shown in Table 3, which also shows the actual TCs. In each case the actual TC was about one SD below the mean TC estimate, and well below the 95% confidence interval for the mean estimate. In addition, the differences between the mean estimates for 10% and 15% APR, and for 1-year and 2-year loans, were significant in all cases at $p < .001$ (*post hoc* comparisons following one-way analysis of variance). However, parametric tests for this data should be treated with caution since all distributions of estimates were bimodal, with one peak at the two responses nearest to the actual TC, and a higher peak at or near the highest two responses of the range available. Table 4 shows the

percentage of responses in each of these pairs of responses: the average percent of correct responses was about 25%, whereas the average of the higher modal categories was about 40%.

With respect to the first hypothesis, then, there was a consistent overestimation of TC across different APRs and loan durations, which replicates and extends the findings of Study 1. The second hypothesis was also confirmed: respondents' TC estimates were sensitive to changes in APR. Finally, in answer to our research question concerning the effect of loan duration, Table 4 shows that there was no evidence that accuracy was consistently greater for 2-year loans compared to the 1-year loan, or that overestimation of 2-year loans was less. Thus, participants generally took loan duration into account when estimating TC.

----- Tables 3 and 4 here -----

3.3. Discussion

The main finding of Study 1 and Study 2 was that many participants overestimated the total cost of credit (TC) when presented with specific APR information. First, in Study 1 they were asked to estimate the TC of a 1-year loan. However, since the responses available did not include a close approximation to the actual TC, some overestimations may have been spurious. In Study 2, therefore, the available responses were changed to include an approximate correct response. The results of this replication were essentially the same, with about ten percent of respondents choosing the correct answer, and more than half overestimating TC. In addition, when APR and loan duration were varied in two further questions, TC estimates were sensitive to such changes. Nevertheless, nearly half of all responses to these questions were also substantially overestimated. The theoretical and policy implications of these findings will be discussed in the final section.

4. Study 3

This study was designed to investigate our second main issue, the effect of APR and TC information on credit decisions. As explained in Section 1.3., the main hypotheses of Study 3 were:

- (1) APR information will influence credit decisions, either because people represent credit options in accordance with the rational economic model, or because they adopt the 'take the best APR' heuristic; and
- (2) TC information will attenuate the effect of APR information on credit decisions when the two cost measures conflict, and enhance its effect when they do not.

In order to test the second hypothesis, decision problems with credit options having different APRs and different loan durations need to be presented in which APR and TC either favour the same alternative or they conflict. For example, consider Option 1 and Option 2 in Table 5. Here there is a basic conflict between loan duration, n (24 months versus 60 months) and monthly repayment, MR (£334.58 versus £163.34). However, the table shows that Option 1 is better because both the APR and TC are lower. On the other hand, consider a choice between Option 3 (48 months, £179.99 per month) and Option 4 (24 months, £352.73 per month). This is a similar conflict between MR and n , but in this case there is a conflict between lower TC, which favours Option 4, and lower APR, which favours Option 3. In order to test hypothesis 2, decision problems of both types were constructed.

----- Table 5 in here -----

4.1. Method

Design and decision scenarios. Participants were presented with scenarios in which they were asked to imagine they had decided to take out a loan for £7,500 for a consumer durable or home improvement and were now considering offers from two banks. Nine scenarios were constructed and in each case, two banks offered credit with alternative n and MR combinations. The option with the shorter loan duration always had the higher MR and

1 the lower TC. In three cases the option with the shorter duration also had the lower APR, but
2 in the other six it had the higher APR so that APR and TC were in conflict. Table 6 shows
3 the nine scenarios in the order presented in the questionnaire. It can be seen that in scenarios
4 2, 5 and 7 the shorter loan also had the lower APR and the lower TC, whereas in the other
5 six, that with the lower APR had the higher TC.

6 ----- Table 6 in here -----

7 A randomised groups, 2 x 2 factorial experimental design was employed, with the two
8 independent variables being APR Information (no APR versus APR), and TC information (no
9 TC versus TC). The dependent variables were the choices made in each scenario for the
10 option with the lower loan duration. Four different versions of a questionnaire were prepared,
11 one for each group of the 2 x 2 design. The questionnaires began with the nine decision
12 scenarios, with one group receiving information on n and MR only, the second received
13 additional information on APR, the third additional information on TC, and the fourth
14 receiving both APR and TC information. The presentation format of the information for the
15 last group is shown in Table 7. The questionnaires continued with a second part dealing with
16 payment protection insurance (presented elsewhere). A third part requested personal details
17 including gender, age group (from one of twelve ranging from age 16 to 70+) and annual
18 income (selecting from eight ranges from up to £10,000 to £40,100 and above).

19 ----- Table 7 in here -----

20 *Participants and Procedure.* The participants were recruited from a random sample
21 of 2000 adults from a high street bank's database of personal account customers and those
22 who had made telephone loan enquiries. They were randomly assigned to one of four equal
23 groups each of which received one of the four questionnaires, posted with a covering letter
24 and return postage paid envelope, to complete anonymously. The letter explained the purpose
25 of the study and that any information provided was for research purposes only and would

1 remain anonymous. The participants were asked to read the introduction, and then to make
2 their decisions by ticking a box. Participants returning the questionnaire could choose to
3 participate in a cash prize draw. If they wished to be included in the draw, contact details
4 were to be entered at the end of the questionnaire, this information was detached from the
5 questionnaire during the opening and sorting process.
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11 Of the 241 replies, (12% return), 52% were female and the majority of participants
12 were older: 37.9% were over 50 years; 31% in the range 41-50 years; 21% between 31-40
13 years; and 6% under 30 years. For annual income: 26.8% had an income of £15K or less;
14 34.5% from £15,100 to £25K; 19.4% from £25,100 to £35K; 19.4% over £35K. With 38.8%
15 of participants with an income of over £25,100, it can be said that the income of the majority
16 was at or below the UK average of £25K. The number of participants returning
17 questionnaires in each group was 55, 60, 60 and 66. Chi-square tests for gender, and Kruskal-
18 Wallis tests for age and income, showed that there were no significant differences in these
19 characteristics across groups.
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33 4.2. Results

34 To investigate the effect of APR and TC information on choice for the option with
35 shorter loan duration, hierarchical log linear analyses were carried out separately for each
36 scenario. These were followed up with a descriptive analysis of the magnitude of the effect
37 of APR information on credit choice across different contexts.
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46 In two of the six scenarios in which TC and APR information were in conflict,
47 scenarios 1 and 9, the hierarchical log linear analyses revealed a significant 3-way association
48 between TC, APR and choice. That is, the final models included the 3-way association
49 representing a significant interaction between APR and TC information, and for both
50 scenarios the partial 3-way association was significant (scenario 1: $\chi^2(1) = 3.99, p < .05$);
51 scenario 9: $\chi^2(1) = 7.09, p < .01$). The nature of the interaction can be seen in the top and
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middle panel of Figure 1. Without TC information the percentage of choices for the option with higher APR dropped substantially when APR information was given, whereas with TC information the percentage difference was very small. Thus, the effect of APR information was significantly attenuated by TC information.

Turning to the three scenarios where both TC and APR information favoured the shorter duration option, in scenario 2 the final model of the hierarchical loglinear analysis also included the 3-way association representing a significant interaction between APR and TC information, and the partial 3- way association was significant ($\chi^2(1) = 4.06, p < .05$). The nature of this interaction can be seen in the bottom panel of Figure 1. In this case there was minimal effect of APR information without TC information but a substantial increase in those choosing the shorter duration (higher APR) when both items of cost information were presented. Thus, TC information amplified the effect of APR information (or vice versa).

----- Figure 1 in here -----

For the remaining six scenarios, the significance criterion for including components in the final model of hierarchical loglinear analyses was relaxed to $p < .10$, in order to identify small effects. On this basis, the final model in scenarios 3 and 4 included the 2-way association representing a main effect of APR. For scenario 3 the final model was not significantly different from the saturated model, ($\chi^2(4) = 1.59, p > .05$) and the partial APR–choice association was significant ($\chi^2(1) = 2.88, p < .10$). For scenario 4, again the final model was not significantly different from the saturated model, ($\chi^2(4) = 1.32, p > .05$), and the partial APR–choice association was significant ($\chi^2(1) = 6.04, p < .01$). In these cases, then, APR information significantly influenced choice and this was not significantly moderated by TC information. However, a slight moderating effect can be seen (see Figure 2). For scenarios 5, 6, 7 and 8, the final model of the hierarchical loglinear analyses only

1 included the 1-way effect of choice. This shows that neither APR nor TC information had a
2 significant effect on choice of credit option.
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5 In order to examine the moderating influence of TC information further, an additional
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7 descriptive analysis of the effect of APR information was carried out. In any decision context,
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9 the percentage choosing the lower APR option in the no APR condition, minus the
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11 percentage choosing it in the APR condition, is an absolute measure of the size of the effect
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13 of APR information on choice. This was calculated separately for the no TC and the TC
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15 groups in each scenario. If the measure is lower in the TC groups then TC information has
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17 attenuated the effect, and if it is greater it has enhanced the effect. For all six scenarios where
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19 APR information was in conflict with TC information the effect of APR was attenuated
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21 (mean APR effect of 15.9% attenuated to 4%). Furthermore, in two of the three scenarios
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23 where TC and APR information were in accordance, TC information enhanced the effect of
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25 APR information (mean APR effect of 1.3% enhanced to 10.4%). Hypothesis 2 was therefore
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27 confirmed as a general effect although the extent of attenuation or enhancement varied quite
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29 widely with decision problem. This explains why only three of the nine tests of interaction
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31 between APR and TC information were significant.
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38 ----- Figure 2 in here -----
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40 41 *4.3. Discussion* 42

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44 The findings of Study 3 can be summarised as follows. First, consistent with our first
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46 hypothesis, loglinear analyses identified a significant effect of APR information on credit
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48 choice in five of the nine decision scenarios presented. Second, in three of these scenarios,
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50 the influence of APR was significantly attenuated or enhanced by TC information. This
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52 moderating effect of TC was observed in all but one scenario, confirming our second
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54 hypothesis as a general finding across the contexts presented in Study 3. The implications of
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56 these findings are considered in the next section.
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5. General discussion and conclusion

5.1. *Financial capability and public understanding of APR*

Our first main issue concerned UK adults' understanding of the relation between two key measures of credit cost, APR and TC. This was investigated in Study 1 and Study 2 by eliciting estimates of TC when specific APR information was presented. The main finding, that participants consistently overestimated TC, can be understood in terms of estimation strategies. In Study 2, a few respondents wrote down an FC estimation strategy similar to Yard's (2004) formula linking FC to the approximate APR ($FC = \text{average loan} \times \text{APR} \times \text{number of years}$) and subsequently chose the correct TC response. Such respondents had good insight into the relation between APR and FC, and therefore TC. However, the general pattern of consistent overestimation that we found is consistent with the use of a similar but erroneous strategy based on the initial, rather than the average loan. Kinsey and McAlister (1981) proposed a similar interpretation of errors in FC estimation observed in several surveys of US adults' knowledge of credit costs, suggesting that people believe that the FC of a 12-month loan is the initial loan \times APR. As discussed in the introduction, APR is a conceptually complex measure of credit cost and from a bounded rationality perspective it is not surprising that even adults with a good level of financial capability make such errors. This may have been due to a heuristic mode of thought being adopted because of the cognitive complexity of the task, coupled with a failure to detect that a more analytic mode was necessary (Stanovich and West, 2008), or simply that the necessary analytic knowledge was missing.

Our other results suggest that otherwise participants had an appropriate understanding of the relation between APR and TC; For example, TC estimates in Study 2 were sensitive to changes in both APR and loan duration. This is in contrast to Lewis and Scott's (2000) study which found a relatively low knowledge and understanding of APR in a UK sample of 16 –

18 year olds: only one third were able to say what the abbreviation stands for, and only a quarter could describe the concept accurately. The recent large-scale survey of UK credit card users found a range of financial capability with respect to APR understanding (OFT, 2004). Our Study 2 participants seemed to be at the higher end of the capability scale, i.e. bank customers with useful experience of managing personal finances including consumer credit, yet even in this group many did not appear to fully understand the relationship between APR and FC or TC.

The common error we found in understanding the relationship between APR and FC or TC could lead people to make poorer credit decisions and it would be useful to take steps to improve citizens' financial capability in this respect. One useful step could be to make the appropriate knowledge more widely available. For example, financial training and information, such as the UK Financial Services Authority 'Pathfinder' programme, could include advice on calculating approximate FC from APR using the simple formula derived from Yard's (2004) analysis, i.e. $FC = \text{average loan} \times (\text{APR}/100) \times \text{number of years}$, where average loan is estimated by $\text{initial loan}/2$. Calculating this should help borrowers to understand that APR is based on the average amount borrowed, rather than the initial amount borrowed. Training and information could also include the reverse formula to calculate approximate APR from FC and loan duration. This should help borrowers to understand that APR is an annual rate measure, not just based on the absolute FC (people can forget this; see Ranyard & Craig, 1995). This would be part of wider support to develop APR understanding that would seem necessary in the light of the credit card survey referred to above, which found that some consumers had a very low level of understanding, for example not knowing whether lower APR indicated a better or worse deal.

5.2. Credit decisions and bounded rationality

1 The second main issue we considered, investigated in Study 3, was the effect of APR
2 and TC information on credit decisions. Based on the dual account model (Ranyard & Craig,
3 1993, 1995) and findings of previous research (Ranyard et al., 2006), our first hypothesis was
4 that APR information would influence credit decisions. This was broadly confirmed,
5 although APR information was not influential in all contexts. In terms of decision heuristics,
6 then, participants did not consistently apply a 'take the best APR' heuristic when choosing
7 credit. Although they were generally able to use APR information appropriately, as the OFT
8 (2004) survey also found, in some scenarios it did not change their preferences. In terms of
9 the dual account model this was probably because recurrent budget period account
10 considerations, and consequently MR cost, were more salient in those scenarios.

11 Our second hypothesis was that TC information would moderate the effect of APR
12 information. Previously, Ranyard et al., (2006, Study 2) had found that the effect of APR was
13 completely eliminated when TC information was presented. In the present Study 3, however,
14 although its moderating effect was generally present, it was rather weak in some scenarios.
15 This may also have been because MR cost was more important in some scenarios, or because
16 TC could be readily calculated from other information presented, i.e. MR and the number of
17 instalments. As discussed earlier, the moderating effect of TC information can be interpreted
18 in terms of a total account representation of instalment credit being used to evaluate the cost
19 of credit options (Ranyard & Craig, 1995). If this is so, the question arises as to why TC
20 information itself did not have a larger effect on credit decisions. Perhaps this was because,
21 as Yard (2004) has shown, people's intuitive perceptions of the cost of the credit described in
22 terms of the number of instalments and MR is more related to FC (and therefore TC) than to
23 APR. If this were so, consumers' perceptions of credit cost would not necessarily change
24 when TC information is provided explicitly.

An implication of the findings of Study 3 for the marketing and regulation of consumer credit is that it confirms our earlier conclusion (Ranyard et al., 2006) that TC information needs to be presented clearly and explicitly in order that consumers can make informed decisions. Currently cost information is often incomplete, making evaluation more difficult. Although APR provides important information for consumer credit decisions, TC is equally important, since consumers often represent and evaluate credit plans in terms of total mental accounts. Finally, taken together, our findings concerning adults' understanding and use of cost and duration information in credit decisions could be applied in the financial capability education and information programmes referred to earlier. Such programmes need to take account of the widely differing levels of numeracy across the adult population (Department for Education and Science, 2003), the role of which is an important issue for future research.

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Table 1.

Study 1: Total Cost estimates for a £5,000, one year loan without APR and with APR at 8% (N = 1023).

Response	£5,000	£5,100	£5,400	£5,700	£6,000	DK*
Without APR	0.6	4.2	27.5	28.0	17.7	22.1
APR 8%	0.5	2.5	43.8	21.0	10.7	21.5

Note: DK = don't know

Table 2.

Study 2: Total Cost estimates for a £5,000, one year loan without APR and with APR at 8%
(N = 234).

Response	£5,000	£5,200*	£5,400	£5,700	£6,000	DK**
Without APR	0.9	9.0	42.3	34.6	9.4	3.8
APR 8%	0.0	9.8	74.3	8.5	3.8	3.4

Notes: * Change of response option from Study 1; ** DK = don't know

Table 3.

Study 2: Means (and SDs) of estimates, and *actual*/TCs (£) for the £7,500 and £15,000 loans

	1-year		2-year	
	Estimate	Actual	Estimate	Actual
<i>£7,500 loan</i>				
10% APR	8,120	<i>7,896</i>	8,496	<i>8,268</i>
	(265)		(300)	
15% APR	8,462	<i>8,082</i>	8,915	<i>8,646</i>
	(238)		(386)	
<i>£15,000 loan</i>				
10% APR	16,021	<i>15,792</i>	17,100	<i>16,536</i>
	(301)		(446)	
15% APR	16,437	<i>16,164</i>	17,335	<i>17,292</i>
	(314)		(243)	

Table 4.

Study 2: Percentages of accurate and modal overestimate responses for the £7,500 and £15,000 loans.

	1-year		2-year	
	Accurate	Overestimated	Accurate	Overestimated
<i>£7,500 loan</i>				
10% APR	24.2	26.5	22.2	50.8
15% APR	31.7	36.5	20.7	60.0
<i>£15,000</i>				
10% APR	22.2	50.8	29.0	37.3
15% APR	27.3	56.1	25.6	40.0

Table 5. Repayment options on a loan of £7,500

OPTION	DURATION	PAY MTH	TC	APR
1	24 months	£334.58	£8,029.92	6.8%
2	60 months	£163.34	£9,800.40	11.7%
3	48 months	£179.99	£8,639.52	7.3%
4	24 months	£352.73	£8,465.52	12.6%

Table 6.

Study 3: The nine decision scenarios for Study 3; Bank A first row, Bank B second.

SCENARIO	DURATION	MR	TOTAL COST	APR
1	48 months	£179.99	£8639.52	7.3%
	24 months	£352.73	£8465.52	12.6%
2*	24 months	£334.58	£8,029.92	6.8%
	60 months	£163.34	£9,800.40	11.7%
3	72 months	£139.23	£10,024.56	10.6%
	36 months	£249.78	£8,992.08	12.9%
4	48 months	£178.65	£8,575.20	6.9%
	36 months	£231.96	£8,350.56	7.3%
5*	36 months	£243.00	£8,748.00	10.8%
	48 months	£201.78	£9,685.44	14.0%
6	84 months	£120.00	£10,080.00	9.2%
	36 months	£241.64	£8,699.04	10.4%
7*	48 months	£190.25	£9,132.00	10.5%
	60 months	£166.25	£9,975.00	12.5%
8	84 months	£126.66	£10,639.44	11.1%
	72 months	£145.38	£10,467.36	12.3%
9	24 months	£356.00	£8,544.00	13.6%
	72 months	£129.23	£9,304.56	7.6%

* Scenarios in which TC and APR do not conflict

Table 7.

The presentation format for the group receiving both APR and TC information.

BANK	DURATION OF LOAN	MONTHLY REPAYMENT	TOTAL COST	APR	Tick ✓
A	36 months	£235.00	£8,460.00	8.3%	
B	60 months	£147.24	£8,834.40	6.8%	